

509,053

(12) INTERNATIONAL PUBLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
9 October 2003 (09.10.2003)

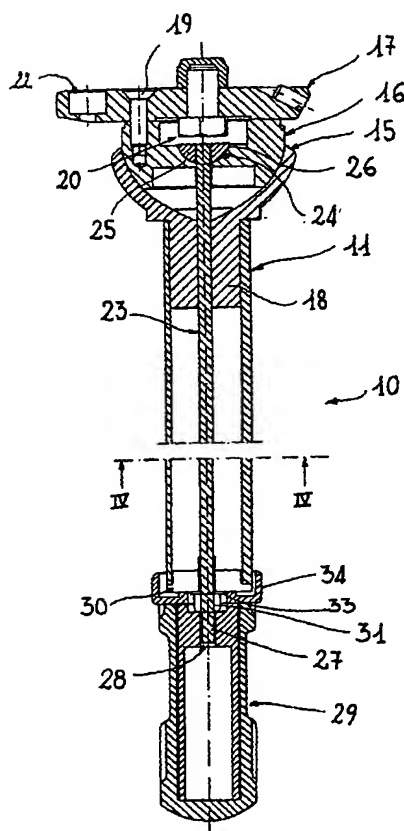
PCT

(10) International Publication Number
WO 03/083351 A1

- (51) International Patent Classification⁷: **F16M 11/32**, 11/14 (74) Agents: CANTALUPPI, Stefano et al.; Cantaluppi & Partners S.r.l., Via Matteotti, 26, I-35137 Padova (IT).
- (21) International Application Number: PCT/IT02/00202 (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.
- (22) International Filing Date: 28 March 2002 (28.03.2002)
- (25) Filing Language: Italian
- (26) Publication Language: English
- (71) Applicant (*for all designated States except US*): LINO MANFROTTO + CO. S.P.A. [IT/IT]; Via Sasso Rosso, 19, I-36061 Bassano del Grappa (IT).
- (72) Inventor; and (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- (75) Inventor/Applicant (*for US only*): SPEGGIORIN, Paolo [IT/IT]; Via Colombara, 6A, I-36065 Mussolente (IT).

[Continued on next page]

SUPPORT FOR APPARATUS IN GENERAL AND, IN PARTICULAR, FOR OPTICAL OR PHOTOGRAPHIC APPARATUS AND THE LIKE



(57) Abstract: A support for apparatus in general and, in particular, for optical or photographic apparatus and the like is described and comprises a pillar (12) arranged to receive the apparatus at a first end and to be housed with its stem (11) in a seat (4) extending through a spider (3) of a tripod (4). The support also comprises, at the first end, an orientable platform (13) for the levelling of the apparatus independently of the positioning of the tripod (1), and the pillar (12) is structurally independent of the spider (3) and can be inserted removably in the seat (4).

WO 03/083351 A1

Best Available Copy

**Declarations under Rule 4.17:**

- as to the identity of the inventor (Rule 4.17(i)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES,

FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

- of inventorship (Rule 4.17(iv)) for US only

Published:

- with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Support for apparatus in general and, in particular, for optical or photographic apparatus and the like.

Technical field

The subject of the present invention is a support for apparatus in general
5 and, in particular, for optical or photographic apparatus and the like, of the type described in the preamble to the main claim.

Technological background

Supports including the above-mentioned characteristics are used widely in the photographic and cinematographic fields, generally in association with tripods
10 or stands for the orientable support of cameras. In this field, a need arises to position the stand or tripod with a pillar support mounted thereon and to be able to orient the apparatus mounted on the stand about its own axis. This need arises typically in so-called panoramic shots.

In this situation, it is necessary to position the tripod with care so that the
15 rotation of the pillar takes place whilst the desired state of levelness of the camera is maintained.

Cinematographic tripods and stands are also known, in which, to avoid the need for levelness, supports are used which have orientable platforms on which the head that supports the optical or photographic apparatus is mounted in turn.
20 However, these supports require rack drives which interfere with the freedom of positioning of the pillar. Moreover, they are wholly unsuitable for applications in which the pillar can be moved to two or more positions on the tripod.

Description of the invention

The main aim of the invention is to provide a support which can be
25 mounted on tripods of conventional design and which at the same time affords all

of the advantages typical of tripods with orientable platforms.

Within the scope of this aim, an important object of the invention is to provide a support which has safety devices for protecting the integrity of the apparatus that can be mounted on it.

5 Another object of the invention is to provide an easily adjustable support.

One of the chief objects of the invention is to provide a support which is designed structurally and functionally to overcome all of the disadvantages discussed with reference to the prior art mentioned.

This aim, with these and further objects, are achieved by a support formed
10 in accordance with the appended claims.

Brief description of the drawings

The character of the advantages of the invention will become clearer from the detailed description of a preferred embodiment thereof, described by way of non-limiting example, with reference to the appended
15 drawings, in which:

Figure 1 is a perspective view of a tripod including a support according to the invention, with parts separated,

Figure 2 is a view of the support of Figure 1 in longitudinal section,

Figure 3 is a plan view of the support of Figure 1,

20 Figure 4 is a section through the support, taken on the line IV-IV of Figure 1.

Preferred embodiment of the invention

In the drawings, a tripod for photographic and/or cinematographic uses, generally indicated 1, has legs 2 all of which converge in a spider 3 through
25 which two seats, both indicated 4, extend; the stem 11 of a pillar 12, forming part

of a support, formed in accordance with the invention and generally indicated 10, is housed alternatively in one or other of the seats 4.

The stem 11 has a three-lobed, tubular configuration with an approximately triangular, equilateral shape with rounded angles. One of the
5 angles has a wall thickening 13 which enables the stem to be machined if necessary to produce an optional rack within the thickness of the thickening 13.

The support 10 comprises, at a first end of the stem 11, an orientable platform 14 including a first ball and socket joint with a socket 15 and a ball 16 fixed firmly to the pillar 12 and to a fixing plate 17 of the platform 14, respectively.
10 The socket 15 is fixed to the pillar by means of a shank 18 of the socket, which is housed and clamped in the stem 11. The ball 16 is fixed to the fixing plate 17 by means of screws 19. The plate 17 also carries fixing means 20, 21 for a head T which is orientable about two or more axes, and spirit-level means 22. The means 20 comprise a screw for clamping the head against the plate 17. The
15 means 21 comprise a plurality of grub screws converging towards the axis of the screw and arranged to preload the screw coupling between the fixing plate 17 and the head T of the apparatus A fixed thereto. Accidental slackening of the screw coupling 20 is thus prevented.

The grub screws 21 are inclined to the axis of the screw 20 so as to be
20 accessible even though they are close to the ball 16 and the overall size of the fixing plate 17 is small.

The ball 16 is clamped in the socket 15 in order to lock the first ball and socket joint by means of a tie rod 23 extending axially through the pillar 12 and restrained on the ball 16 by means of a second ball and socket joint 24 including
25 a ball 25 fixed to the end of the tie rod 23 and a spherical seat 26 formed in the

ball 16 of the first joint.

At its end remote from the ball 25, the tie rod 23 has a threaded shank 27 which is engaged by screwing in a female thread 28 formed in a knob 29. A plug 30 is inserted in the end of the stem 11 corresponding to the knob 29 and a self-
5 locking nut 31 is screwed onto the threaded shank 27 to abut the plug 30, with the interposition of a Belleville washer 33. A friction load is thus provided in the first and second ball and socket joints, independently of the slackening or removal of the knob 29 from the shank 27, that is, when the tie rod is slackened, so as to secure the photographic apparatus A mounted on the orientable
10 platform against abrupt oscillations and impacts resulting from such slackening.

A small plate 34 interposed between the knob 29 and the pillar 12, is fixed firmly to the knob and projects radially therefrom to interfere with the spider 3 to prevent the pillar accidentally slipping out of the seat 4.

The sliding of the pillar in the seat 4 can be stopped in an adjustable
15 position by means of a brake 35, for example, of the type with a screw-operated block mounted on the spider 3 and operable by means of a hand wheel, or by means of the devices provided for in the Applicant's Italian patent application No. PD98A000096.

In order to clamp the orientable head T, for example, a panoramic head,
20 on the support 10, or to clamp an optical, photographic, or cinematographic apparatus such as the video camera A directly on the support, the camera is positioned on the fixing plate 17 and is fixed thereon as indicated, by the means 20, 21. The orientable platform is then levelled by slackening the knob 29, and with it the tie rod 23, as much as necessary in order to pivot the socket and ball
25 15, 16 of the first ball and socket joint relative to one another. Should the tie rod

be slackened too much, the maintenance of a friction preloading by the nut 31 and by the Belleville washer 33 prevents sudden pivoting of the orientable platform and consequent damage to the apparatus A supported thereon. Upon completion of the desired levelling, which can be achieved by virtue of the spirit-level means 22, the knob 29 is tightened in order to lock the first ball and socket joint in the position reached.

It is pointed out that, by virtue of the shape of the stem 11 and of the seat 4, which provide for a non-rotatable, guided coupling of the pillar in the spider, the levelling of the orientable platform is maintained, even if the height position of the support relative to the tripod is varied.

The desired height adjustment is thus performed in the knowledge that the levelling achieved will be maintained for any rotation of the apparatus by means of its support head.

In order to remove the support 10 from the tripod, it suffices to slacken the knob 26 completely until it is removed from the threaded shank 27 of the tie rod 23, together with the small plate 34, and then to release the block brake disposed in the spider 3.

The invention thus achieves the aim proposed and affords many advantages over conventional supports. By producing the support in a form such that it is removable from the tripod, the tripod can be used in different combinations and in different positions.

Moreover, the prevention of relative rotation between the pillar and the spider achieves the advantage mentioned above, that the levelling of the platform is maintained irrespective of the movement of the pillar relative to the spider.

The provision of a friction load on the first ball and socket joint constitutes

a precautionary measure for protecting the support and whatever is mounted on it.

The provision of thickenings in the stem permits optional machining thereof for a rack drive.

CLAIMS

1. A support for apparatus in general and, in particular, for optical or photographic apparatus and the like, comprising a pillar (12) arranged to receive the apparatus at a first end and to be housed with its stem (11) in a seat (4) extending through a spider (3) of a tripod (4), characterized in that the support comprises, at the first end, an orientable platform (14) for the levelling of the apparatus independently of the positioning of the tripod (1), and in that the pillar (12) is structurally independent of the spider (3) and can be inserted removably in the seat (4).
2. A support according to Claim 1 in which the orientable platform (14) comprises a first ball and socket joint including a ball (16) and a socket (15) fixed first to a fixing plate (17) of the platform and to the stem (11) of the pillar, respectively, or vice versa, and a tie rod (23) acting between the socket (15) and the ball (16) in order, when tensioned, to prevent relative rotation thereof.
3. A support according to Claim 2 in which spirit-level means (22) are associated with the plate (17).
4. A support according to Claim 2 or Claim 3 in which fixing means (20) for a head (T) for the orientable support of the apparatus are associated with the plate (17).
5. A support according to one or more of the preceding claims in which the fixing means comprise at least one screw coupling which can clamp the head (T) or apparatus against the fixing plate (17) and at least one grub screw (21) which can preload the screw coupling between the plate (17) and the head (T) or apparatus.
6. A support according to one or more of the preceding claims in which the

tie rod (23) extends through the stem (11) of the pillar and is operated by means of a knob (29) associated with a second end of the pillar (12), remote from the first end.

7. A support according to one or more of the preceding claims in which a
5 knob (29) is screwed onto the tie rod (23) by operative actuation of the knob (29).

8. A support according to one or more of the preceding claims in which the knob (29) is associated removably with the tie rod (23) in order to be removed for the purpose of the removal of the pillar (12) from the seat in the spider (3) and its insertion therein.

10 9. A support according to one or more of the preceding claims in which a small plate (34), removable with the knob (29), is interposed between the knob (29) and the pillar (12) and can project radially from the pillar (12) in order to prevent the pillar from accidentally slipping out of the seat.

10. A support according to Claim 9 in which the small plate (34) is fixed firmly
15 to the female thread (28) of the knob.

11. A support according to one or more of the preceding claims in which preloading means are provided on the tie rod for ensuring a friction load in the first ball and socket joint when the tie rod is slackened.

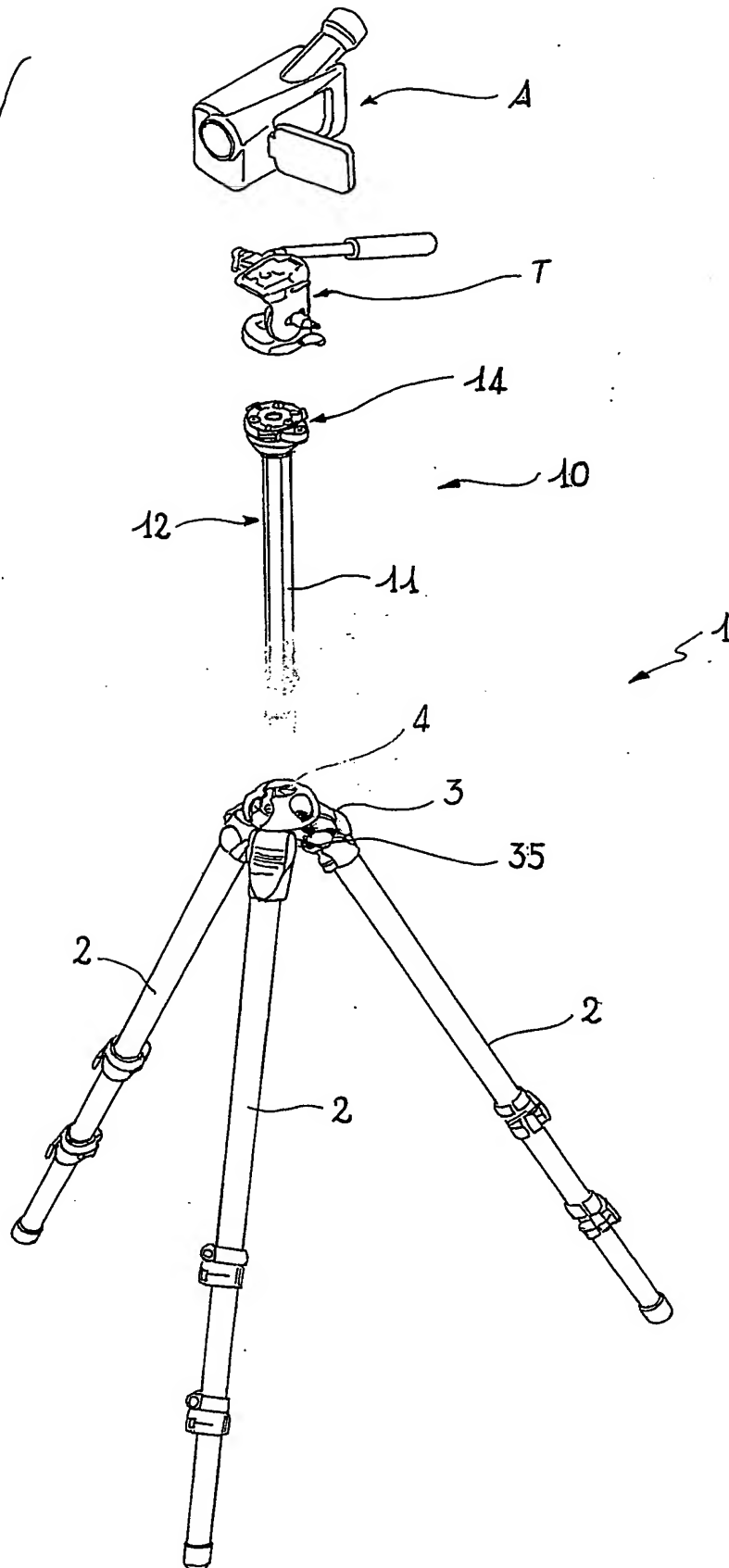
12. A tripod including a support according to one or more of the preceding
20 claims in which the pillar (12) is slidable in the seat (4), locking means being provided between the spider (3) and the pillar (12) for locking the pillar (12) in the seat (4), in an adjustable position along the stem (11).

13. A tripod according to Claim 12 in which the locking means comprise a brake (35) mounted in the spider (3).

14. A tripod according to Claim 12 or Claim 13 in which the shape of the stem (11) of the pillar (12) and of the seat (4) in the spider (3) is such as to provide a non-rotatable guided coupling of the pillar in the spider.

1/2

Fig. 1



2/2

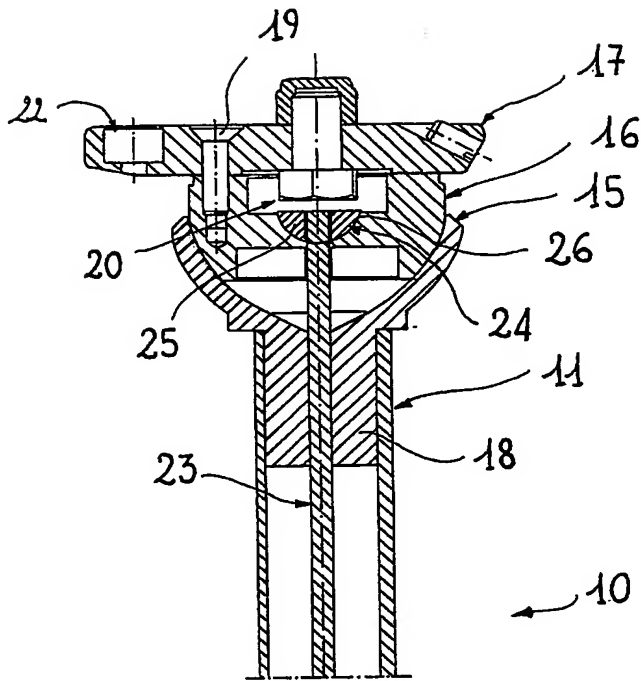


Fig. 2

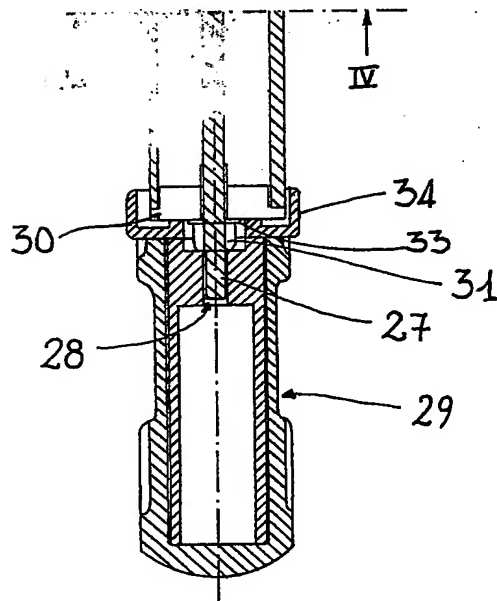


Fig. 3

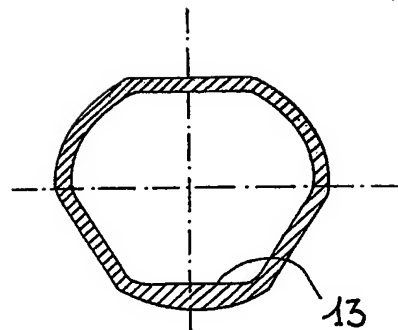
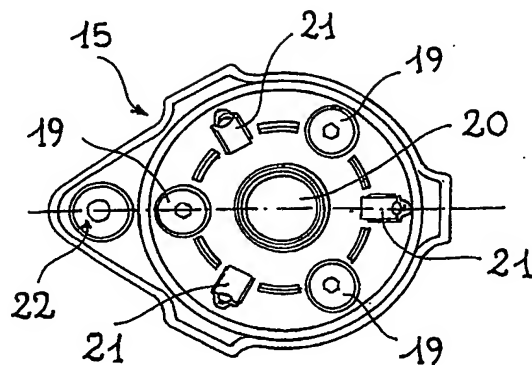


Fig. 4



INTERNATIONAL SEARCH REPORT

Intel
International Application No
T/IT 02/00202A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 F16M11/32 F16M11/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 F16M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

WPI Data, PAJ, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| X | US 3 128 982 A (CHRISTOPHER) 14 April 1964 (1964-04-14) column 2, line 27 - line 45; figures 1,2 | 1,12,13 |
| X | US 4 579 436 A (JAUMANN LEONHARD) 1 April 1986 (1986-04-01) column 2, line 36 -column 3, line 40; figures 1-3 | 1,12,13 |
| X | US 2 168 988 A (HULTQUIST BERNARD A) 8 August 1939 (1939-08-08) page 2, left-hand column, line 27 -right-hand column, line 27; figures 1-4 | 2 1,12,13 |
| A | --- | 2 |
| | --- -/-- | |

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the International filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

* & * document member of the same patent family

Date of the actual completion of the international search

21 November 2002

Date of mailing of the international search report

28/11/2002

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax (+31-70) 340-3016

Authorized officer

Baron, C

INTERNATIONAL SEARCH REPORT

Intel

nal Application No

T/IT 02/00202

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| A | DE 36 577 C (MÜLLER) 18 August 1886 (1886-08-18) the whole document ---- | 1-4 |
| A | FR 919 481 A (COUTANT) 10 March 1947 (1947-03-10) the whole document ---- | 2,6,7 |
| A | EP 0 952 383 A (MANFROTTO LINO & C SPA) 27 October 1999 (1999-10-27) cited in the application column 2, line 56 -column 3, line 14; figures 1-3 ---- | 12,13 |
| A | DE 39 39 540 A (ASANUMA) 6 June 1991 (1991-06-06) column 2, line 35 - line 52; figures 1,2 ----- | 14 |

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

/IT 02/00202

| Patent document cited in search report | | Publication date | Patent family member(s) | Publication date |
|---|---|---------------------|--|--|
| US 3128982 | A | 14-04-1964 | NONE | |
| US 4579436 | A | 01-04-1986 | DE 3425374 C1 AU 577873 B2 AU 4457685 A GB 2161857 A , B IT 1208818 B JP 61092394 A | 02-01-1986 06-10-1988 16-01-1986 22-01-1986 10-07-1989 10-05-1986 |
| US 2168988 | A | 08-08-1939 | NONE | |
| DE 36577 | C | | NONE | |
| FR 919481 | A | | NONE | |
| EP 0952383 | A | 27-10-1999 | IT PD980096 A1 CN 1232935 A DE 69804761 D1 EP 0952383 A2 JP 11311398 A US 6164843 A | 25-10-1999 27-10-1999 16-05-2002 27-10-1999 09-11-1999 26-12-2000 |
| DE 3939540 | A | 06-06-1991 | DE 3939540 A1 | 06-06-1991 |

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☒ FADED TEXT OR DRAWING
- ☒ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.